2014792

GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PERFORMANCE
THE MONADNOCK COMPANY
CITY OF INDUSTRY, CALIFORNIA

1.0 BACKGROUND

The Monadnock Company (Monadnock) site is located at 18301 Arenth Avenue in City of Industry, California. TRW formerly used the facility to fabricate fasteners and electronic hardware from 1968 to 1980, using manufacturing processes that included degreasing, heat treating, and metal plating. Volatile organic compounds (VOCs) used in these processes, in addition to cadmium, chromium, and cyanide, have been detected in groundwater beneath the site.

Soil remediation activities were conducted onsite in the late 1980s and early 1990s. These included excavation and offsite disposal of VOC-impacted soil in 1986 through 1989, and the operation of a soil vapor extraction (SVE) system in 1993. Following the shutdown of the SVE system, the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) issued a letter to TRW, dated 6 May 1994, indicating that soil had been remediated to allowable contaminant levels and that no additional soil remediation was required.

Groundwater investigation and monitoring have been conducted at the Monadnock facility since 1986. Eight monitoring wells have been installed at locations both onsite and offsite (Figure 1), and include seven wells in the shallow interval (extending to about 45 to 60 feet below ground surface [bgs]) and one well in a deeper interval (extending to 97 feet bgs). One shallow onsite monitoring well (MW-2) has been converted for use as an extraction well, as discussed below.

2.0 GROUNDWATER CONDITIONS

The water table occurs at a depth of about 30 to 32 feet bgs and exhibits minimal seasonal fluctuations, generally varying only about one to two feet in elevation during the past seven years. The stratigraphy within the saturated zone consists predominantly of silty to clayey sand, grading into a cleaner and coarser sand below a depth of about 85 feet bgs.

Historic analytical results for the eight wells indicate that groundwater is impacted primarily by trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), and tetrachloroethene (PCE), in addition to chromium and cyanide. The shallow VOC plume is oriented in a west-southwest direction, similar to the direction of groundwater flow, and extends offsite across Fullerton Road to the area of well MW-12 (Figure 1). Shallow VOC concentrations are greatest in onsite well MW-2 and offsite well MW-12, and are substantially lower in the nearby surrounding wells, indicating that the plume is only about 200 feet in width. The greatest VOC concentrations were observed in 1986, but have declined appreciably since that time.

VOC concentrations in the one deeper monitoring well at the site, MW-11, indicate that the impact to the deeper interval is substantially less than the shallow interval. Historical groundwater analytical results for all wells are provided in Table 1 and are discussed in Section 5.0.

3.0 GROUNDWATER TREATMENT SYSTEM

A groundwater treatment system utilizing well MW-2 for extraction was implemented onsite in November 1995 for the purpose of remediating shallow VOC-impacted groundwater. The system extracted groundwater from well MW-2 using an electric submersible pump and transferred it through a four-canister carbon adsorption unit to remove VOCs and a two-cartridge ion exchange unit to remove chromium. Treated groundwater was discharged to the stormdrain under a National Pollutant Discharge Elimination System (NPDES) permit. A description of the system and its operation was provided in a report prepared by ID Environmental Associates, Inc. (IDEA) and submitted to the Regional Water Quality Control Board (RWQCB) in December 1995.

Prior to treatment system installation, a well yield test was conducted to estimate the maximum expected discharge rate that well MW-2 is capable of sustaining during long-term pumping. The test was conducted with the pump set at a depth of about 41.5 feet bgs (intake at 41 feet bgs), which is about three feet above the bottom of the well (44.5 feet bgs). Analysis of both the pumping and recovery data indicated that the long-term sustainable yield of well MW-2 under current water-level conditions is about 0.5 to 1.0 gallons per minute (gpm).

4.0 TREATMENT SYSTEM PERFORMANCE

The treatment system was started in November 1995 and was operated continuously until June 1998. The system has been out of service since that time because it was damaged by site construction activities and requires repair.

The system was operated at an average flow rate of about 0.6 gpm in 1996 and 1997, but the rate declined to about 0.2 gpm in 1998. The decline was believed to be due to clogging of the chromium filters and is not related to the aquifer yield. The total volume of groundwater pumped annually was about 288,000 gallons in 1996, about 294,000 gallons in 1997, and about 45,000 gallons in 1998, for a total flow volume of 627,000 gallons. Based on these flow volumes and the total VOC concentrations in groundwater extracted from well MW-2 (averaged yearly based on the semiannual sampling results), the total pounds (lbs) of VOCs removed annually by the system were as follows: 0.9 lbs in 1996; 1.04 lbs in 1997; and 0.36 lbs in 1998. Total VOCs removed by the system from 1995 to 1998 were 2.3 lbs.

5.0 HISTORIC GROUNDWATER CHEMICAL CONCENTRATIONS

5.1 VOC Concentrations

Graphs of VOC concentrations versus time were generated for shallow wells MW-2, MW-7, MW-8, and MW-12 using the monitoring data presented in Table 1, and are shown on Figure 2. These graphs depict the trend in VOC concentrations since each of the wells was installed. Hydrographs of water levels versus time for the four wells are shown on Figure 3.

As indicated on Figure 2, VOC concentrations in wells MW-2, MW-7, and MW-8 have declined appreciably since 1986 and 1987, but reached generally stable concentrations in about mid 1995, prior to installation of the groundwater extraction and treatment system. Operation of the

treatment system from November 1995 through June 1998 did not result in an additional reduction in VOC concentrations, as discussed below. VOC concentrations in offsite downgradient well MW-12 have fluctuated sporadically.

Total VOC concentrations in well MW-2 have declined from a maximum of about 1800 µg/l in 1986 to 238 µg/l in July 2001. The total concentration remained generally stable during operation of the remediation system from 1995 to 1998, varying from about 330 µg/l to 500 µg/l. The only exception was a temporary increase in February 1998. Total concentrations have since declined to levels varying from about 250 µg/l to 350 µg/l, despite shutdown of the system in June 1998. The well exhibited no apparent concentration decline as a result of groundwater extraction and treatment conducted from November 1995 until June 1998.

Wells MW-7 and MW-8 have demonstrated trends similar to that observed in well MW-2, declining appreciably since 1987 but remaining at generally stable or declining levels since 1995. The wells exhibited the same temporary increase in February 1998 as that observed in well MW-2. The wells exhibited no apparent concentration decline as a result of groundwater extraction and treatment conducted from November 1995 until June 1998.

Total VOC concentrations in well MW-12, which was installed downgradient of well MW-2 in 1995, have fluctuated widely since 1995 and although they have not exhibited an appreciable decline, their range has remained consistent. These fluctuations appear unrelated to either operation or shutdown of the groundwater extraction and treatment system, but rather appear to coincide with fluctuations in the water table.

Total VOC concentrations in the one deeper monitoring well at the site, MW-11, have historically been substantially less than in the shallow interval. Maximum total concentrations recorded in 1989 were about 300 µg/l, but declined below 100 µg/l by 1994. Total concentrations during operation of the remediation system varied from about 40 µg/l to 60 µg/l, with the exception of the temporary increase in February 1998 that was also observed in the shallow wells. Concentrations since shutdown of the system have declined to historic low levels, in the absence of active treatment, and are currently at about 17 µg/l.

5.2 Metals and Cyanide Concentrations

Historic metals and cyanide results indicate that chromium and cyanide concentrations have exceeded MCLs during previous monitoring events. However, these impacts have been observed primarily in well MW-2 and occasionally in well MW-12. Concentrations of both compounds have declined substantially in well MW-2 since the mid 1990s and are currently below the MCL for cyanide and essentially equal to the MCL for chromium. Concentrations in well MW-12, as well as the other monitoring wells, are currently below MCLs for both compounds.

6.0 SUMMARY

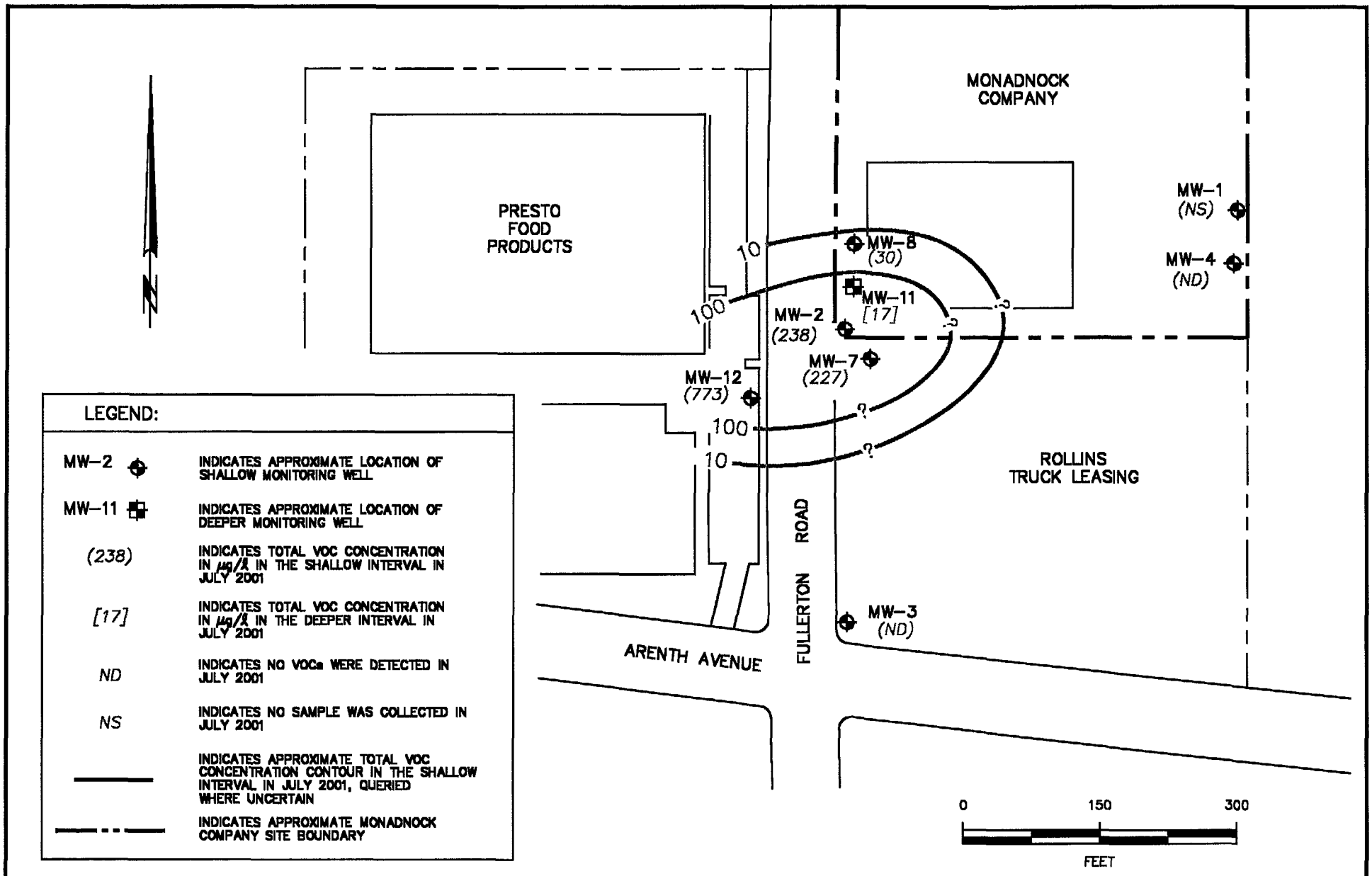
VOC-impacted groundwater beneath the site and vicinity occurs primarily in the shallow interval (about 30 to 60 feet bgs), and is restricted to a narrow plume of about 200 feet in width. Stratigraphy within the shallow interval is comprised predominantly of fine-grained materials

consisting of silty to clayey sands. Hydraulic testing of extraction well MW-2 indicates correspondingly low hydraulic conductivity values in this interval and an estimated long-term sustainable well yield of only about 0.5 to 1.0 gpm.

A groundwater extraction and treatment system utilizing shallow well MW-2 was operated from late 1995 until June 1998, at an average discharge rate of about 0.6 gpm. The system removed a total of 2.3 lbs of VOCs during this period. The system has been out of service since June 1998 due to damage sustained during site construction activities.

Total VOC concentrations in the shallow interval onsite have declined substantially since monitoring began in 1986. However, concentrations reached generally stable concentrations in about mid 1995, prior to installation of the groundwater extraction and treatment system, and remained at those levels during system operation. Concentrations have continued to remain at stable levels or declining levels since 1998, despite shutdown of the system in June 1998.

Operation of the treatment system did not result in an additional reduction in VOC concentrations following its startup in November 1995. The onsite groundwater VOC plume appears to have reached stable concentrations independent of treatment system operation and exhibited no apparent benefit from the system. Furthermore, plume concentrations have shown no increase following shutdown of the system, but instead have continued to remain at stable or declining levels in the absence of active treatment.



TRW INC.
1900 Richmond Road
Cleveland, Ohio 44124

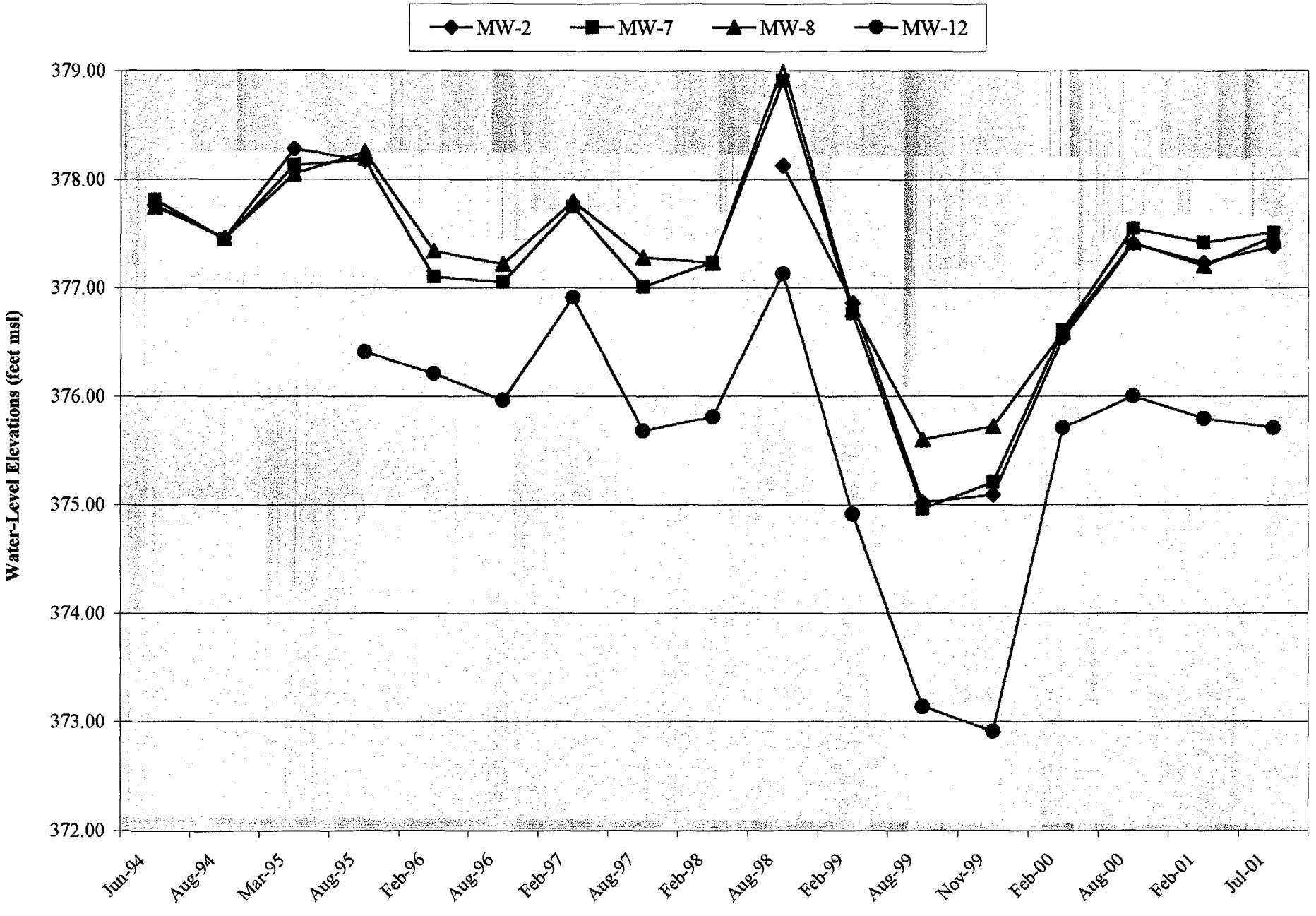
DESIGNED	LAN
DRAWN	SCS
REVIEWED	LAN
CHECKED	MT
SCALE	1"=150 FEET
DATE	8-17-00

THE MONADNOCK COMPANY

TOTAL VOC CONCENTRATION CONTOUR MAP JULY 2001

REVISION 0
PROJECT MON.07.01.015
FIGURE 1

MONfig1.dwg



TRW	Monadnock Company Site, City of Industry, CA	Project: MON.07.01.015
	Water-Level Elevations vs. Time - Wells MW-2, MW-7, MW-8 and MW-12	**FIGURE 3**

TABLE 1

HISTORIC GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	cis-1,2-DCE (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	**200**	**32**	**5**	**6**	**0.5**	**6**	**100[1]**	**NE**	**5**	**5**	**10**	**50**	**0.2[2]**
MW-1													
Jul-86	<25	NA	NA	NA	NA	ND	NA	ND	<25	<25	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-88	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	ND	NA	ND	ND	ND	NA	NA	NA
Jun-89	ND	NA	NA	ND	NA	ND	NA	ND	ND	ND	NA	NA	NA
Jan-90	ND	NA	NA	ND	NA	ND	NA	ND	1.3	ND	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	NA	NA	NA
Aug-94	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<1	7.7	<0.01
Mar-95	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Aug-95	<1	<1	<1	1.5	<1	ND	<1	ND	<1	<1	<5	<10	<0 1
Feb-96	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.2
Aug-96	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Aug-97	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Feb-98	<1	<1	<1	<1	<1	ND	<1	ND	1.06	<1	<5	<10	<0.01
Aug-98	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
Feb-99	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
MW-2													
Jul-86	380	NA	NA	NA	NA	ND	NA	ND	310	710	NA	NA	NA
Sep-86	180	NA	NA	NA	NA	ND	NA	ND	600	560	NA	NA	NA
Nov-86	350	NA	NA	NA	NA	ND	NA	ND	770	710	NA	NA	NA
Feb-87	77	NA	NA	NA	NA	ND	NA	ND	190	620	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-87	12	NA	NA	NA	NA	ND	NA	ND	102	182	NA	NA	NA
Feb-88	25	NA	NA	NA	NA	ND	NA	ND	78	102	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	ND	NA	ND	70	120	NA	NA	NA
Jun-89	ND	NA	NA	180	NA	ND	NA	ND	320	270	NA	NA	NA
Jan-90	7	NA	NA	840	NA	ND	NA	ND	410	460	NA	NA	NA
Jun-94	<1	21	10	120	3.3	ND	2.4	ND	130	590	NA	NA	NA
Aug-94	<1	19	8.6	160	3.4	ND	1.3	ND	100	390	<1	162	0.57
Mar-95	<1	17.5	8.3	176	4.1	ND	2.5	ND	102	330	<5	206	<0.01
Aug-95	<1	<1	5.8	82	2	ND	2.1	ND	12	170	<5	164	1.82
Feb-96	<2.5	3.5	<2.5	98	<2.5	ND	<2.5	ND	69	200	<5	85.6	1.60
Aug-96	<1	5.3	3.6	95	<1	ND	1.1	ND	53	220	<5	60.8	0.25
Aug-96 Dup	<1	5.5	3.7	97	1.2	ND	1.2	ND	54	220	NA	NA	NA
Feb-97	<1	4.7	2.2	70	1.2	ND	<1	ND	51.8	220	<5	43.4	0.693
Aug-97	<5	<5	<5	160	<5	ND	<5	ND	79	260	<5	42	0.16

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Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	cis-1,2-DCE (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	**200**	**32**	**5**	**6**	**0.5**	**6**	**100[1]**	**NE**	**5**	**5**	**10**	**50**	**0.2[2]**
Feb-98	<1	6.76	5.65	325	2.89	ND	2.1	ND	152	456	<5	47	0.363
Sep-98*	<0.5	2.9	2.1	89	1.1	ND	<0.5	<0.5	48	190	<5	79	0.42
Feb-99	<0.5	1.2	0.7	26	<1	ND	<0.5	<0.5	14	61	<5	47**	0.18
Aug-99	<0.5	3.2	2.1	77	0.8	ND	1	<0.5	25	140	<0.5	35	0.18
Nov-99	<0.5	5.7	3.6	110	1.2	0.6	1.4	<0.5	49	190	0.7	49	0.22
Feb-00	<0.5	3	2.1	78	<0.5	<0.5	0.9	<0.5	46	160	<5	48	<0.05
Feb-00 Dup	<0.5	2.9	2	75	<0.5	<0.5	0.9	<0.5	42	150	5.3	52	<0.05
Aug-00	<0.5	4.6	3.1	76	1.1	0.6	1.2	<5	45	240	<5	49	0.14
Feb-01	<0.5	2.5	2.1	56	0.9	<0.5	1	<0.5	56	230	<5	50	0.06
Jul-01	<0.5	1.9	1.6	54	0.7	<0.5	0.7	<0.5	29	150	<10	51	0.13
MW-3													
Jul-86	<5	NA	NA	NA	NA	ND	NA	ND	<5	<5	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Nov-86	6	NA	NA	NA	NA	ND	NA	ND	100	4	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-88	2	NA	NA	NA	NA	ND	NA	ND	6.2	2.6	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	ND	NA	ND	ND	ND	NA	NA	NA
Jun-89	1	NA	NA	ND	NA	ND	NA	ND	6	2	NA	NA	NA
Jan-90	ND	NA	NA	ND	NA	ND	NA	ND	ND	2	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	NA	NA	NA
Aug-94	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	1.4	14.3	<0.01
Mar-95	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	23.9	<0.01
Aug-95	<1	<1	<1	1.4	<1	ND	<1	ND	<1	<1	<5	<10	<0.1
Feb-96	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.2
Aug-96	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Aug-97	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Feb-98	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Aug-98	<0.5	<0.5	<0.5	<0.5	<1	ND	<0.5	<0.5	<0.5	<0.5	<1	3.52	<0.05
Feb-99	<0.5	<0.5	<0.5	<0.5	<1	ND	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.05
Aug-99	<0.5	<0.5	<0.5	<0.5	<0.5	ND	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.05
Nov-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<2	<0.05
Feb-00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	31	<0.05
Aug-00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<5	<15	<0.05
Aug-00 Dup	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<5	<15	<0.05
Feb-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	<0.5	<5	<15	<0.05
Feb-01 Dup	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<15	<0.05
Jul-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<0.05

TABLE 1

HISTORIC GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	cis-1,2-DCE (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	**200**	**32**	**5**	**6**	**0.5**	**6**	**100[1]**	**NE**	**5**	**5**	**10**	**50**	**0.2[2]**
MW-4													
Jul-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Mar-87	0.5	NA	NA	NA	NA	ND	NA	ND	1.6	1	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-88	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Jan-89	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Jun-89	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Jan-90	ND	NA	NA	ND	NA	ND	NA	ND	1.9	ND	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	NA	NA	NA
Aug-94	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<1	6.4	<0.01
Mar-95	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	2.67
Aug-95	<1	<1	<1	1.1	<1	ND	<1	ND	<1	<1	<5	<10	<0.1
Feb-96	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.2
Aug-96	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	ND	<1	ND	<1	<1	<5	<10	<0.01
Aug-97	<1	<1	<1	<1	<1	ND	<1	ND	1.2	<1	<5	<10	<0.01
Feb-98	<1	<1	<1	<1	<1	ND	<1	ND	1.33	<1	<5	<10	<0.01
Aug-98	<0.5	<0.5	<0.5	<0.5	<1	ND	<0 5	1.8	<0.5	<0.5	<1	5.89	<0.05
Feb-99	<0.5	<0.5	<0.5	<0.5	<1	ND	<0.5	1.8	0.6	<0.5	<5	38	<0.05
Aug-99	<0.5	<0.5	<0.5	<0.5	<0.5	ND	<0.5	2.2	0.6	<0.5	<0.5	<2	<0.05
Nov-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	0.7	<0.5	<0.5	2.9	<0.05
Nov-99 Dup	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	0.7	<0.5	<0.5	2	<0.05
Feb-00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<5	<15	<0.05
Aug-00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	0.7	<0.5	<5	<15	<0.05
Feb-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5	1	<5	<15	<0.05
Jul-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<0.05
MW-7													
Jul-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	N.A	NA
Mar-87	48	NA	NA	NA	NA	ND	NA	ND	81	456	NA	NA	NA
Sep-87	56	NA	NA	NA	NA	ND	NA	ND	93	200	NA	NA	NA
Feb-88	8.2	NA	NA	NA	NA	ND	NA	ND	74	152	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	ND	NA	ND	150	200	NA	NA	NA
Jun-89	50	NA	NA	42	NA	ND	NA	ND	60	66	NA	NA	NA
Jan-90	1.6	NA	NA	440	NA	ND	NA	ND	160	400	NA	NA	NA
Jun-94	<1	2.8	<1	40	<1	ND	1 8	ND	42	280	NA	NA	NA
Aug-94	<1	17	6.2	140	1.7	ND	2.4	ND	60	310	1.3	115	0.76

TABLE 1

HISTORIC GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	cis-1,2-DCE (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	**200**	**32**	**5**	**6**	**0.5**	**6**	**100[1]**	**NE**	**5**	**5**	**10**	**50**	**0.2[2]**
Mar-95	<1	4.5	<1	66	<1	ND	<1	ND	28	145	<5	49.6	0.14
Aug-95	<1	<1	<1	43	<1	ND	<1	ND	1.9	130	<5	26.5	0.025
Feb-96	<1	<1	<1	36	<1	ND	<1	ND	18	120	<5	36.3	0.37
Aug-96	<1	4.5	1.3	46	<1	ND	<1	ND	20	87	<5	38.2	0.30
Feb-97	<1	3.6	<1	41	<1	ND	<1	ND	31	170	<5	35	0.126
Feb-97 Dup	<1	4.1	1.1	47	<1	ND	<1	ND	35	180	NA	NA	NA
Aug-97	<1	<1	<1	43	<1	ND	<1	ND	18	105	<5	17.4	<0.01
Aug-97 Dup	<5	<5	<5	45	<5	ND	<5	ND	18	150	NA	NA	NA
Feb-98	<1	5.89	2.54	172	1.02	ND	1.24	ND	57.3	222	<5	19.6	0.353
Aug-98	<0.5	<0.5	0.8	53	<1	ND	<0.5	ND	16	170	<1	31.2	<0.05
Aug-98 Dup	<0.5	<0.5	0.7	60	<1	ND	<0.5	<0.5	18	180	NA	NA	NA
Feb-99	<0.5	1.1	0.6	24	<1	ND	<0.5	<0.5	9	82	<5	46	<0.05
Aug-99	<0.5	1.6	1.1	78	0 8	ND	0.7	<0.5	17	150	<0 5	28	0.06
Nov-99	<0.5	2.1	1.8	130	<0.5	<0.5	0.9	<0.5	32	260	<0.5	34	<0.05
Feb-00	<0.5	1.7	1.2	85	<0.5	<0.5	0.7	<0 5	27	180	<5	26	<0.05
Aug-00	<0.5	<0.5	1.1	75	<0.5	<0.5	0.7	<5	24	220	<5	28	<0.05
Feb-01	<0.5	<0.5	0.5	22	<0.5	<0.5	<0.5	<0.5	9.3	120	<5	15	<0.05
Jul-01	<0.5	<0.5	<0.5	31	<0.5	<0.5	<0 5	<0.5	4.8	47	<10	16	<0.05
Jul-01 Dup	<0.5	0.6	0.8	52	<0.5	<0.5	<0.5	<0.5	14	160	<10	17	<0.05
MW-8													
Jul-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Mar-87	32	NA	NA	NA	NA	ND	NA	ND	110	180	NA	NA	NA
Sep-87	3	NA	NA	NA	NA	ND	NA	ND	27	47	NA	NA	NA
Feb-88	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	ND	NA	ND	80	90	NA	NA	NA
Jun-89	30	NA	NA	180	NA	ND	NA	ND	320	400	NA	NA	NA
Jan-90	ND	NA	NA	100	NA	ND	NA	ND	56	160	NA	NA	NA
Jun-94	<1	<1	<1	16	<1	ND	<1	ND	6.8	34	NA	NA	NA
Aug-94	<1	<1	9.4	<1	<1	ND	<1	ND	5.5	22	4.8	135	<0.01
Mar-95	<1	<1	<1	11.7	<1	ND	<1	ND	3.3	18.8	<5	20.4	<0.01
Aug-95	<1	<1	<1	7.9	<1	ND	<1	ND	<1	19	<5	14.4	<0.1
Feb-96	<1	<1	<1	17	<1	ND	<1	ND	11	35	<5	20.5	<0.2
Aug-96	<1	<1	1.6	16	<1	ND	<1	ND	11	39	<5	<10	<0.01
Feb-97	<1	<1	<1	8.3	<1	ND	<1	ND	12	33	<5	<10	<0.01
Aug-97	<1	<1	1.4	14	<1	ND	<1	ND	12	32	<5	<10	<0.01
Feb-98	<1	<1	2.26	31.1	<1	ND	<1	ND	23	52	<5	<10	<0.01
Aug-98	<0.5	<0.5	<0.5	2.6	<1	ND	<0.5	<0.5	2.3	8.5	4 21	5.22	<0.05
Feb-99	<0.5	<0.5	0.6	6.2	<1	ND	<0.5	0 6	4.7	15	<5	5	<0.05
Aug-99	<0.5	0.9	2.4	35	0.6	ND	0.7	<0.5	15	80	<0.5	12	<0.05

TABLE 1

HISTORIC GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	cis-1,2-DCE (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	**200**	**32**	**5**	**6**	**0.5**	**6**	**100[1]**	**NE**	**5**	**5**	**10**	**50**	**0.2[2]**
Aug-99 Dup	<0.5	1	2.6	46	0.7	ND	0.8	0.6	18	90	<0.5	18	<0.05
Nov-99	<0.5	<0.5	0.7	9.7	<0.5	<0.5	<0.5	<0.5	6.1	24	<0.5	7.5	<0.05
Feb-00	<0.5	<0.5	<0.5	5.8	<0.5	<0.5	<0.5	<0.5	5.1	16	<5	<15	<0.05
Aug-00	<0.5	<0.5	<0.5	2.5	<0.5	<0.5	<0.5	<5	2.9	16	<5	<15	<0.05
Feb-01	<0.5	<0.5	<0.5	3	<0.5	0.5	<0.5	<0.5	2.7	14	<5	<15	<0.05
Jul-01	<0.5	<0.5	0.6	5.8	<0.5	<0.5	<0.5	<0.5	4	20	<10	<10	<0.05
MW-11													
Jul-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA
Feb-88	ND	NA	NA	NA	NA	ND	NA	ND	ND	26	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	ND	NA	ND	200	20	NA	NA	NA
Jun-89	ND	NA	NA	50	NA	ND	NA	ND	10	270	NA	NA	NA
Jan-90	ND	NA	NA	231	NA	ND	NA	ND	5.5	50	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	ND	1.8	ND	7	86	NA	NA	NA
Aug-94	<1	<1	16	<1	<1	ND	<1	ND	4.7	49	<1	13	<0.01
Mar-95	<1	<1	<1	20.3	<1	ND	<1	ND	4.1	59.6	<5	13.1	<0.01
Aug-95	<1	<1	<1	12	<1	ND	<1	ND	<1	43	<5	13.3	<0.01
Feb-96	<1	<1	<1	12	<1	ND	<1	ND	3.8	40	<5	<10	<0.2
Aug-96	<1	<1	<1	12	<1	ND	<1	ND	4.8	45	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	ND	<1	ND	4.7	47	<5	<10	<0.01
Aug-97	<1	<1	<1	9.3	<1	ND	<1	ND	4.3	30	<5	<10	<0.01
Feb-98	<1	<1	<1	23.6	<1	ND	<1	ND	10.6	63.1	<5	<10	<0.01
Feb-98 Dup	<1	<1	<1	21.2	<1	ND	<1	ND	10	59.4	NA	NA	NA
Aug-98	<0.5	<0.5	<0.5	9.1	<1	ND	<0.5	1.4	2.7	37	<1	4.15	<0.05
Feb-99	<0.5	<0.5	<0.5	8.3	<1	ND	<0.5	<0.5	3	38	<5	<5	<0.05
Aug-99	<0.5	<0.5	<0.5	16	<0.5	ND	<0.5	<0.5	4.2	62	<0.5	3.4	<0.05
Nov-99	<0.5	<0.5	<0.5	18	<0.5	<0.5	<0.5	<0.5	5.4	71	<0.5	3.2	<0.05
Feb-00	<0.5	<0.5	<0.5	11	<0.5	<0.5	<0.5	<0.5	3.3	38	<5	<15	<0.05
Aug-00	<0.5	<0.5	<0.5	3.6	<0.5	<0.5	<0.5	<5	1.5	23	<5	<15	<0.05
Feb-01	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	<0.5	0.6	10	<5	<15	<0.05
Jul-01	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	<0.5	<0.5	0.7	14	<10	<10	<0.05
MW-12													
Aug-95	<1	<1	6.7	250	7	ND	4.1	ND	13	540	<5	25.6	0.502
Feb-96	<5	<5	<5	230	<5	ND	<5	ND	60	380	<5	37.5	0.38
Feb-96 Dup	<5	<5	<5	210	<5	ND	<5	ND	57	360	NA	N.A	NA
Aug-96	<1	9.2	5.2	210	4.5	ND	2.9	ND	65	330	<5	30.4	0.37
Feb-97	<1	2.4	1.2	66	1.1	ND	1.1	ND	39	220	<5	25.7	.0.051
Aug-97	<5	<5	<5	120	<5	ND	<5	ND	60	270	<5	32.9	0.11

TABLE 1

HISTORIC GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	cis-1,2-DCE (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	**200**	**32**	**5**	**6**	**0.5**	**6**	**100[1]**	**NE**	**5**	**5**	**10**	**50**	**0.2[2]**
Feb-98	<1	8.91	4.97	227	5.04	ND	3.4	ND	60.7	489	<5	59.2	0.111
Aug-98	<0.5	2.4	1.5	110	1.8	ND	0.6	<0.5	21	190	<1	30.7	0.16
Feb-99	<0.5	6.4	3.9	300	2.7	ND	2.2	<0.5	47	520	<5	23**	0.19
Feb-99 Dup	<0.5	6.8	3.6	260	2.8	ND	2.1	<0.5	48	460	<5	NA	0.07
Aug-99	<0.5	4.9	3.2	170	2.7	ND	1.9	<0.5	30	280	<0.5	25	<0.05
Nov-99	<0.5	3.2	2.4	170	2	<0.5	1.7	<0.5	30	220	<0.5	10	0.09
Feb-00	<0.5	2.2	1.8	150	1.4	<0.5	1.2	<0.5	32	190	<5	54	0.09
Aug-00	<0.5	2.1	1.4	94	1.4	<0.5	0.9	<5	17	150	<5	98	0.1
Feb-01	<0.5	4.4	3.2	170	2.4	<0.5	1.9	<0.5	38	350	<5	<15	0.35
Jul-01	<2.5	5	3.6	290	3.1	<2.5	2.9	<2.5	48	420	<10	12	0.13

Drinking water standards are Maximum Contaminant Levels as established by the California Department of Health Services.
1 - Drinking water standard is for total trihalomethanes.
2 - Drinking water standard is the Maximum Contaminant Level as established by the U.S. Environmental Protection Agency.
NA - Not Analyzed
ND - Not Detected
NE - Not Established
< - Not detected at the detection limit shown.
* - Well sampled on September 29, 1998, as well required repair before sampling could occur.
** - Well resampled for dissolved chromium on May 7, 1999.

1,1,1-TCA - 1,1,1-Trichloroethane
1,1,2-TCA - 1,1,2-Trichloroethane
1,1-DCA - 1,1-Dichloroethane
1,1-DCE - 1,1-Dichloroethene
1,2-DCA - 1,2-Dichloroethane
cis-1,2-DCE - cis-1,2-Dichloroethene
CFM - Chloroform
DFM - Dichlordifluoromethane
PCE - Tetrachloroethene
TCE - Trichloroethene